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ENTOMOLOGY.¹

Termitophilous Insects.—E. Wasman has lately described² a number of new termitophilous insects, erecting for part of them the genus *Termitobia* and has summarized our present knowledge of the guests of termites. He says that very little is known concerning the guests of the termites as compared with those of ants, largely because the former are chiefly confined to the tropical and sub-tropical regions and also because the investigation of their nests is more difficult. But in spite of this more than fifty species of termitophilous animals are known. Of these forty belong to the Coleoptera, two to Orthoptera, one to Heteroptera, one to Lepidoptera, two or three to Thysanura, one to the mites (Acaroidea), one to the Arachnida, and one is a Nematode. Of the beetles one is a species of *Glyptus* with its larva, and thirty-nine are Staphylinidæ. The author refers to the investigations of Mr. E. A. Schwarz in North America.³

Notes on the Mouth Parts and Thorax of Insects and Chilopods.—The difference between the mouth parts of true insects and Chilopods are usually mentioned in text-books. But when one believes that insects must have come from some form similar to living Chilopods, it becomes a matter of interest to see what is the homology between the various parts of the mouth. As it is usually stated, Chilopods have one pair of mandibles, two pairs of maxillæ, and a pair of maxillipeds; insects a pair of mandibles, one pair of maxillæ, and a labium. The mandibles are of similar structure in both groups. In Chilopods the first pair of maxillæ are two-lobed; the second pair of maxillæ, or first pair of legs (as it is sometimes called), is, in structure, like a pair of legs; the maxillipeds are a modified pair of legs, large and powerful, used for seizing the prey. The dorsal scuta of the segment to which the maxillipeds belong is frequently not wholly united to the head, but is plainly visible (*Lithobius*).

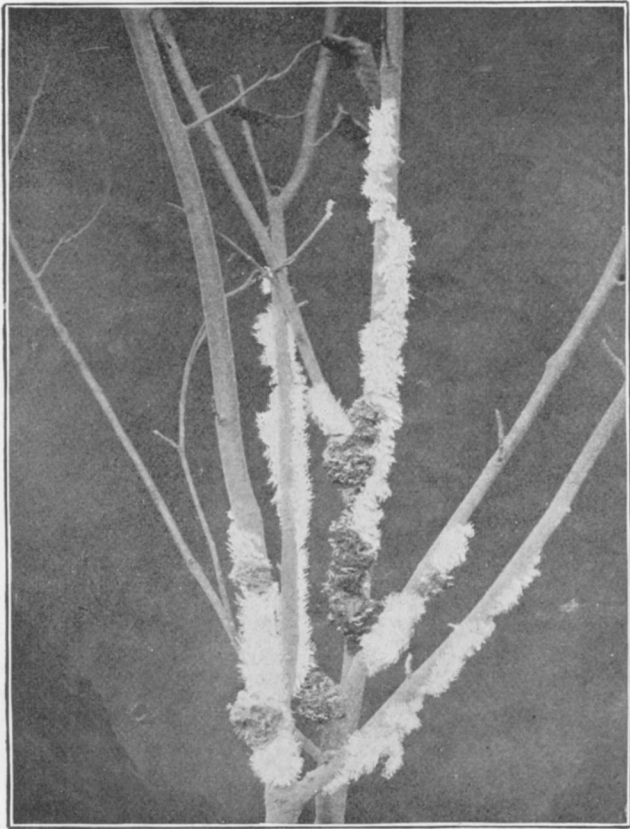
We here see what is well-known among the higher Crustacea; the tendency to the cephalization of thoracic segments in order that their appendages may function as mouth parts. If such is the case, what

¹Edited by Clarence M. Weed, Hanover, N. H.

²Neues Termitophilen, mit einer Uebersicht über den Termitengäste. Verhandl. Zoologisch botanisch Gesellsch. in Wien, xli, 647.

³Proc. Ent. Soc. Wash., i, 161.

PLATE X.



The Woolly Alder Aphis.

has become of the second maxillæ and the maxillipeds? The maxilla of insects is composed of three portions, the palpus, the galea, and the lacinia with the basal joints. If now we look at a Perlid larva (the lowest winged insect) the secret lies revealed; the basal joints of the maxillipeds have united to form the sub-mentum, the remaining joints by their pressure have united to the basal joints of the maxillæ. Yet in the Perlid larva the union is not complete and one can plainly see that the palpiger is not articulated to the stipes, but has basal joints which are concealed by the stipes and the two parts of the cardo. So that the maxillæ of insects is equal to the first maxillæ of Chilopods plus the maxillipeds. The labium of insects appears to be the same as the second maxillæ of Chilopods, the mentum being the united basal joints.

I would also call attention to the steady tendency observable in Chilopods toward the union of certain thoracic segments. In the lower Chilopods (*Geophilus*) the segments are all of about equal size, and each one bears a spiracle. A little higher, in *Scolopocryptops*, we see that there are two kinds of segments, the large with spiracles, the small without them. Segments 2, 4 and 6 are small, the 7th and 8th both large, after that every other one is small. In *Lithobius* the process is continued still further, the small being smaller, the large larger. In *Scutigera* (the highest Chilopod) the dorsal scutæ of the small segments become united to the larger ones, so that seen from above, the first scuta (prothorax) covers one pair of legs, the second scuta (mesothorax) covers two pairs, the third scuta (metathorax) covers two pairs, and the fourth scuta covering three pairs of legs. Therefore I conceive that the mesothorax and metathorax of insects are each composed of two segments. This would appear quite probable if one but look at a grasshopper; but there exists greater proof. *Machilis* (a common Thysanuran) has on each abdominal segment a pair of small appendages, which have been recognized as representing legs, but the meso- and metathorax also bear these appendages beside the normal legs; hence if these appendages represent legs the meso- and metathorax of *Machilis* must be compound segments. It is possible that each abdominal segment is compound, but I hardly think this probable, since the first abdominal segment of insects, which is very small, appears to represent the small sixth segment of *Scutigera*. If this theory of the insect thorax be true, the thorax consists of five segments, segments one, three, and five bearing legs, segments two and four bearing wings.

NATHAN BANKS, Sea Cliff, N. J.

The Woolly Alder Aphis.—In the current report of the New Hampshire Experiment Station observations are recorded by Clarence M. Weed which show that in autumn large numbers of the young of this species (*Schizoneura tessellata* Fitch) are born by the parthenogenetic females. These young descend the alder shrubs to the surface of the ground, where they congregate, under various sorts of shelter, in enormous numbers. They remain there throughout the winter, and in spring those which have not been washed away or otherwise destroyed climb up the trunk to the limbs, where they fix themselves on the lower surface of the bark and grow rapidly into other parthenogenetic females. No males, females, or eggs have been found. This insect has been very abundant in New England during recent years; the appearance of an infested branch is shown in the accompanying plate.

Further Note on the Tineid Case-worm from the Grand Canyon—In my description of the seed-like lepidopterous case-worm from the Grand Canyon in the February, 1893, number of THE NATURALIST, pp. 166-169, figs. 2 and 3, it should be mentioned that the hair line in fig. 2 shows *twice* the natural size of the larva. Fig. 2 was intended to be reduced one-half, and was so indicated on the margin of the original drawing. The hair line was made twice the length of the larva, so that when the whole was reduced one-half it would represent the natural size, stated in the description as $2\frac{3}{8}$ mm.

It seems very certain that this larva is a tineid. It is well-known that these small larvæ often construct cases in which they live; and, as Dr. Packard states (Guide, p. 342), the larvæ of some of the smaller tineid genera (*Antispila*, *Tinagma*, etc.) are absolutely footless.

The narrow-leaved willow referred to in the description is *Salix longifolia* Muhl., while the round-leaved leguminous tree is *Cercis occidentalis* Torr. The elevation of that part of the canyon referred to as 2500 ft. below the rim is 5000 ft. above sea level.

C. H. TYLER TOWNSEND.

The Puparium of Blepharipeza.—*Blepharipeza* is a genus of Tachinidæ s. str., belonging in the subfamily *Hystriiniæ*, and thus closely allied to *Dejeania* and the other Tachinidæ that are characterized by the presence of dense and spiny macrochaetæ on the scutellum and abdomen. *Blepharipeza* may at once be recognized in this group by its hind tibiæ being thickly ciliate on their outer edge with more or less flattened bristles.

The following description is drawn from a puparium of *Blepharipeza adusta* Lev., from which emerged a ♀ specimen of the fly, both of which were sent to me by Mr. Harrison G. Dyar, who bred the fly from a larva of *Halisidota argentata*. It will serve to indicate the distinctive features of the puparium in this interesting genus. I do not know that any description has ever been published of the puparium in this group, except the very brief one of *Belvosia bifasciata* by Dr. Riley (Bull. 3, U. S. Ent. Com., p. 42). The latter indicates the puparium of *Belvosia* to be very different from that of *Blepharipeza* in the structure and situation of the anal stigmata or spiracles. This may serve to emphasize the distinctness of the two genera, which some authors have been prone to combine under the name *Belvosia*.

Description of Puparium.—Length, 10 mm.; greatest width and thickness, 5 mm. Color dark brown. Almost cylindrical, perfectly rounded at both ends, the anterior end a little less in diameter than the posterior, the transverse and dorso-ventral diameters of each segment equal. There appear to be 12 segments, including the capital and anal plates, but the segments are very ill-apparent on the posterior end, very plain anteriorly. A belt or zone of circular (longitudinal to the belt, transverse to the puparium) minute corrugations alternate with one having a rugose surface, there being 10 of the corrugated or fluted belts, and 10 of the rugose or punctured belts. The rugose belts are about one-half the width of the fluted belts, and there is apparently one of each to each segment of the puparium, not including the capital and anal plates. The anterior one-third of each segment is occupied by the rugose belt, and the posterior two-thirds by the fluted belt, these belts more or less clearly defining the segments. Mouth parts of larva showing on capital plate as a wrinkled protuberance consisting of 4 principal eminences, separated from each other by a wrinkle or fold of the integument. Each eminence is more or less minutely wrinkled, the wrinkles as well as the large folds radiating from the center of the protuberance. Anal stigmata showing an anal plate at center of posterior extremity of puparium, as a pair of organs, each marked by 3 short raised ridges, the two upper ones more or less parallel with each other, inclined outward above and at an angle of about 45 degrees with the lower one, which is not quite parallel with the transverse diameter of the puparium. These ridges are usually more or less slightly curved; when curved, it is always with the slight convexity outward from the center of the organ or stigma. The two stigmata occupy the same transverse plane of the puparium. What appears like an anal vent is situated exactly ventrally of the pair of

anal stigmata, forming with them the corners of an equilateral triangle the vent representing the lower or exactly inferiorly directed angle. This vent consists of a circular raised portion of the integument, rugose in appearance, of about the same diameter as either stigma, and with a little circular pit-like depression on top. Exactly ventrad of this vent is a smaller, more irregularly shaped tubercle, apparently situated on the tenth segment. It is hardly more than three times as much removed from the anal vent as that is from either stigma, measuring from center to center.

The puparium is furnished inside with a fine, white, silken, membranous lining.—C. H. TYLER TOWNSEND, Las Cruces, New Mexico.